1. (Previously Presented) An apparatus for charging and discharging a capacitor to predetermined setpoints comprising:

a smart material actuator;

a voltage controlled DC to DC converter for operating the smart material actuator in a proportional manner;

a constant supply voltage supplying the voltage controlled DC to DC converter; and

a control signal providing a selectable input voltage wherein an output voltage of the DC to DC converter is applied to the smart material actuator and wherein the output voltage is proportional to the selectable input voltage.

2.. (Original) The apparatus of claim 1, wherein the voltage controlled DC to DC converter further comprises a self-oscillating drive circuit connected to a primary coil of a transformer with drive signals 180 degrees out of phase.

3. (Original) The apparatus of claim 2, wherein the voltage controlled DC to DC converter further comprises an auxiliary coil on the transformer.

4. (Cancelled).

5. (Previously Presented) The apparatus of claim 2, wherein the voltage controlled DC to DC converter further comprises an attached diode rectifier to generate a DC voltage from an AC signal of a secondary coil on the transformer.

6. (Original) The apparatus of claim 2, wherein the voltage controlled DC to DC converter further comprises a voltage feedback network for voltage regulation.

7. (Original) The apparatus of claim 2, wherein the voltage controlled DC to DC converter further comprises 2 NPN transistors defining a push-pull transformer driver.

8. (Original) The apparatus of claim 2, wherein the voltage controlled DC to DC converter further comprises control circuitry for stopping and starting the self-oscillating mechanism.

9. (Original) The apparatus of claim 1, wherein the voltage controlled DC to DC converter further comprises a diode on an input stage for reverse polarity protection.

10. (Original) The apparatus of claim 1, wherein the converter further comprises both a bead inductor and bypass capacitor for suppression of radiated EMI into a power source.

11. (Original) The apparatus of claim 1 further comprising a smart material drive circuit for actively charging and discharging the smart material actuator in response to connecting and disconnecting a power source respectively.

12. (Previously Presented) The apparatus of claim 1 further comprising a smart material drive circuit for actively controlling at least one of charging and discharging the smart material actuator in response to the control signal.

13. (Original) The apparatus of claim 2, wherein the transformer is of wound core design.

14. (Original) The apparatus of claim 2, wherein the transformer is of LTCC design.

15. (Original) An apparatus for charging and discharging a capacitor to predetermined setpoints comprising:

a smart material actuator;

a power source connectible to the smart material actuator; and

a switch circuit for actively discharging the smart material actuator in response to removal of the connection to the power source.

16. (Original) The apparatus of claim 15 further comprising the switch circuit for actively charging the smart material actuator in response to connecting the power source.

17. (Original) The apparatus of claim 15 further comprising the switch circuit for actively controlling charging and discharging the smart material actuator in response to a control signal input.

18. (Original) The apparatus of claim 15 further comprising the switch circuit for actively controlling at least one of charging and discharging the smart material actuator in response to a control signal.

19. (Previously Presented) The apparatus of claim 15, wherein the switch circuit further comprises a voltage comparator and FET transistor to control a DC to DC converter.

20. (Previously Presented) The apparatus of claim 19, wherein the switch circuit has three operational modes, charge load, hold load and discharge load.

21. (Previously Presented) The apparatus of claim 15, wherein the switch circuit further comprises a voltage comparator and FET transistor to control an active discharge of the smart material actuator.

22. (Previously Presented) The apparatus of claim 21, wherein the switch circuit has three operational modes, charge load, hold load and discharge load.

23. (Previously Presented) A method for charging and discharging a capacitor to predetermined setpoints comprising the steps of:

providing a smart material actuator;

operating the smart material actuator in a proportional manner with a voltage controlled DC to DC converter;

supplying a constant supply voltage to the voltage controlled DC to DC converter; and

providing a control signal having a selectable input voltage wherein an output voltage of the DC to DC converter is applied to the smart material actuator and wherein the output voltage is proportional to the selectable input voltage.

24. (Original) The method of claim 23 further comprising the step of connecting a self-oscillating drive circuit to a primary coil of a transformer with drive signals 180 degrees out of phase.

25. (Original) The method of claim 24 further comprising the step of providing an auxiliary coil on the transformer.

26. (Cancelled).

27. (Previously Presented) The method of claim 24 further comprising the step of attaching a diode rectifier to generate a DC voltage from an AC signal of a secondary coil on the transformer.

28. (Original) The method of claim 24 further comprising the step of feeding back a voltage signal for voltage regulation.

29. (Original) The method of claim 24 further comprising the step of providing two NPN transistors defining a push-pull transformer driver.

30. (Original) The method of claim 24 further comprising the step of stopping and starting the self-oscillating mechanism with control circuitry.

31. (Original) The method of claim 23 further comprising the step of providing a diode on an input stage for reverse polarity protection.

32. (Original) The method of claim 23 further comprising the step of suppressing radiated EMI into a power source with both a bead inductor and bypass capacitor.

33. (Original) The method of claim 23 further comprising the step of actively charging and discharging the smart material actuator in response to connecting and disconnecting a power source respectively with a smart material drive circuit.

34. (Previously Presented) The method of claim 23 further comprising the step of actively controlling at least one of charging and discharging the smart material actuator in response to the control signal with a smart material drive circuit.

35. (Original) A method for charging and discharging a capacitor to predetermined setpoints comprising the steps of:

providing a smart material actuator;

connecting a power source to the smart material actuator; and

actively discharging the smart material actuator in response to removal of the connection to the power source with a switch circuit.

36. (Original) The method of claim 35 further comprising the step of actively charging the smart material actuator in response to connecting the power source with the switch circuit.

37. (Original) The method of claim 35 further comprising the step of actively controlling charging and discharging the smart material actuator in response to a control signal input with the switch circuit.

38. (Original) The method of claim 35 further comprising the step of actively controlling at least one of charging and discharging the smart material actuator in response to a control signal with the switch circuit.

39. (Original) The method of claim 35 further comprising the step of controlling a DC to DC converter with a voltage comparator and FET transistor.

40. (Previously Presented) The method of claim 39, wherein the switch circuit has three operational modes, charge load, hold load and discharge load.

41. (Previously Presented) The method of claim 35 further comprising the step of controlling an active discharge of the smart material actuator with the switch circuit.

42. (Previously Presented) The method of claim 41, wherein the switch circuit has three operational modes, change load, hold charge and discharge load.

43. (Previously Presented) The apparatus of claim 1, further comprising:

a first comparator receiving a first reference voltage related to an analog control voltage and receiving a first load voltage related to a voltage of the smart material actuator;

a first switch receiving an input from the first comparator;

a second comparator receiving a second reference voltage related to the analog control voltage and receiving a second load voltage related to the voltage of the smart material actuator;

a second switch receiving an input from the second comparator; and wherein when the first load voltage is greater than the first reference voltage, the first switch prevents the DC to DC converter from supplying power to the smart material actuator; and

wherein when the first reference voltage is greater than the first load voltage, the first switch allows the DC to DC converter to supply power to the smart material actuator; and wherein when the second load voltage is greater than the second reference voltage, the second switch causes the smart material actuator to discharge.

44. (Currently Amended) The method of claim [[21]] 23, further comprising the steps of:

comparing a first reference voltage related to an analog control voltage with a first load voltage related to a voltage of the smart material actuator;

comparing a second reference voltage related to the analog control voltage with a second load voltage related to the voltage of the smart material actuator;

switching the DC to DC converter off when the first load voltage is greater than the first reference voltage;

switching the DC to DC converter off when the first reference voltage is greater than the first load voltage; and

discharging the smart material actuator when the second load voltage is greater than the second reference voltage.

45. (New) The apparatus of claim 15, wherein the switch circuit for actively discharging further includes a controllable electrical connection switchable between an open state and a closed state in order to ground the smart material actuator, thereby causing active discharge of capacitive load in response to removal of the power source connection to the smart material actuator.

46. (New) The method of claim 35, wherein the step of activiely discharging further includes the step of.

switching a controllable electrical connection between an open state and a closed state in order to ground the smart material actuator, thereby causing active discharge of capacitive load in response to removal of the power source connection to the smart material actuator.